09901557 "030801

Fig.1

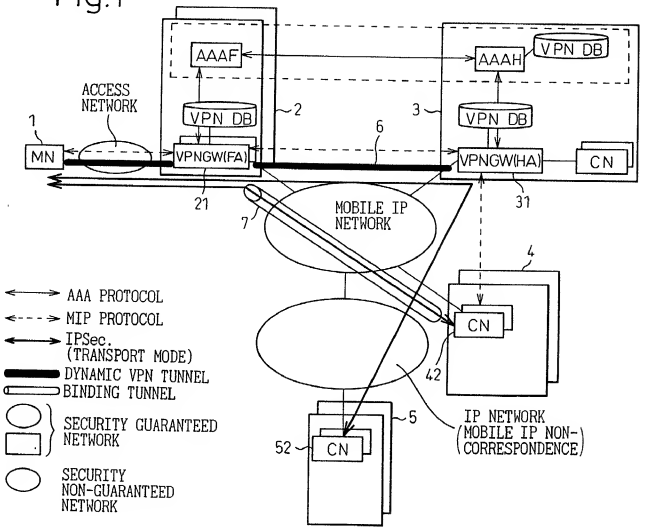


Fig.2

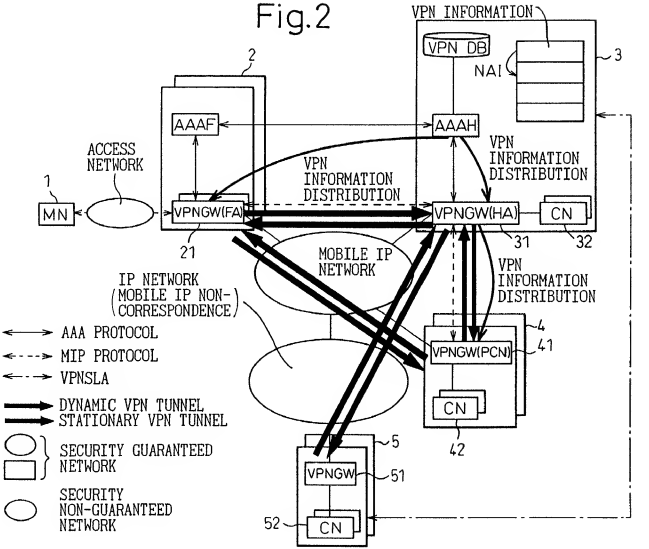
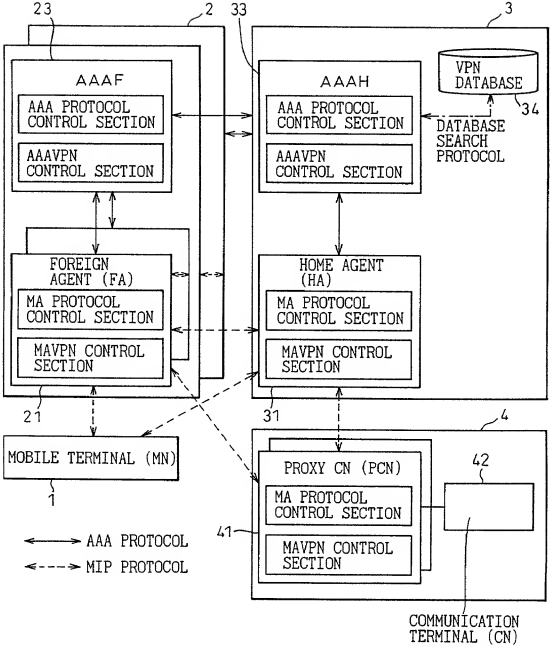
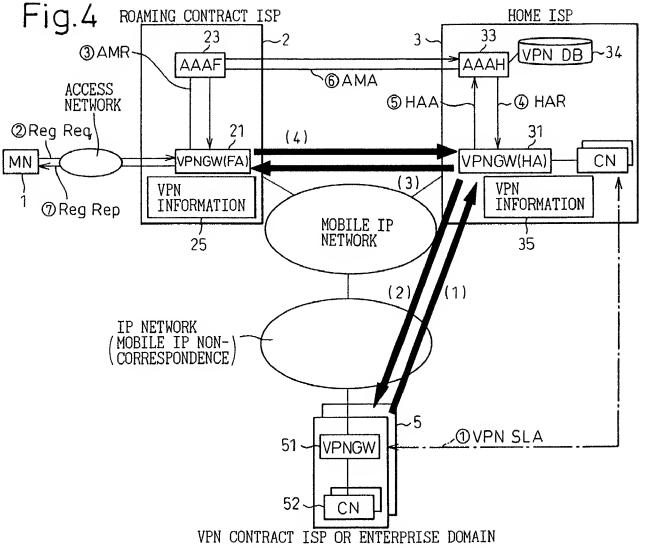

VPN INFORMATION
VPN DB
NAI
3
2
AAAF
AAAH
ACCESS NETWORK
VPN INFORMATION DISTRIBUTION
VPN INFORMATION DISTRIBUTION
1
MN
VPNGW(FA)
VPNGW(HA)
CN
21
31
32
MOBILE IP NETWORK
VPN INFORMATION DISTRIBUTION
IP NETWORK (MOBILE IP NON-CORRESPONDENCE)
4
41
VPNGW(PCN)
CN
42
AAA PROTOCOL
MIP PROTOCOL
VPNSLA
DYNAMIC VPN TUNNEL
STATIONARY VPN TUNNEL
SECURITY GUARANTEED NETWORK
SECURITY NON-GUARANTEED NETWORK
5
VPNGW
51
52
CN

Fig.3


23
2
33
3
AAAF
AAA PROTOCOL CONTROL SECTION
AAAVPN CONTROL SECTION
AAAH
AAA PROTOCOL CONTROL SECTION
AAAVPN CONTROL SECTION
VPN DATABASE
34
DATABASE SEARCH PROTOCOL
FOREIGN AGENT (FA)
MA PROTOCOL CONTROL SECTION
MAVPN CONTROL SECTION
HOME AGENT (HA)
MA PROTOCOL CONTROL SECTION
MAVPN CONTROL SECTION
21
31
4
MOBILE TERMINAL (MN)
1
PROXY CN (PCN)
MA PROTOCOL CONTROL SECTION
MAVPN CONTROL SECTION
42
41
AAA PROTOCOL
MIP PROTOCOL
COMMUNICATION TERMINAL (CN)

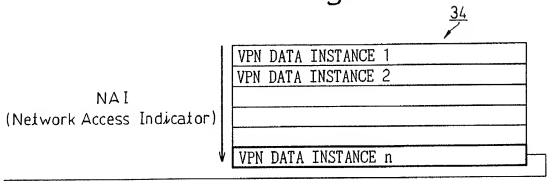
T080ED' 2SST0860

Fig.4



EP 0 806 860 A2

Fig.5



COLUMN NAME	TYPE	REMARKS
Profile Number	int4	IDENTIFIER THAT UNIQUELY SHOWS THIS VPN INFORMATION (KEY PARAMETER)
Nai	text	NAI OF THIS USER
vpnshare	bool	VPN SHARED INDICATOR 0: SHARED 1: INDIVIDUAL
destaddr	text	IP ADDRESS OF COMMUNICATION DESTINATION TERMINAL
upclass	int4	QoS CLASS IN UPWARD DIRECTION
downclass	int4	QoS CLASS IN DOWNWARD DIRECTION
upSPI	int4	UPWARD SPI USED IN IPSec.
downSPI	int4	DOWNWARD SPI USED IN IPSec.

T08060' 2SST0860

Fig.6

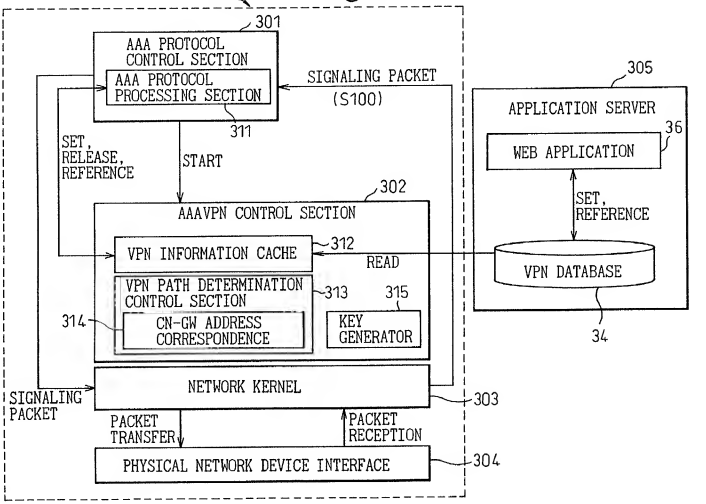
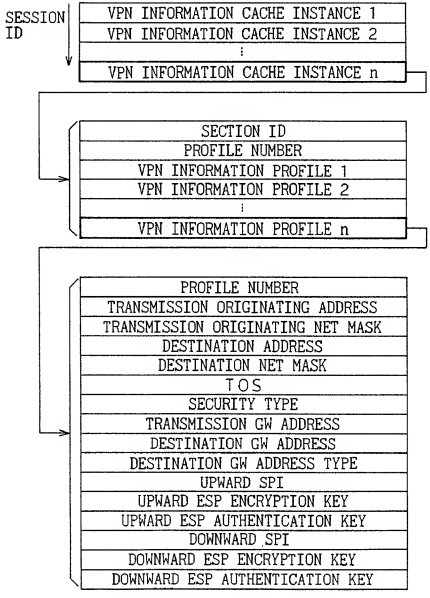


Fig.7



EP 1 357 457 A2

Fig.8

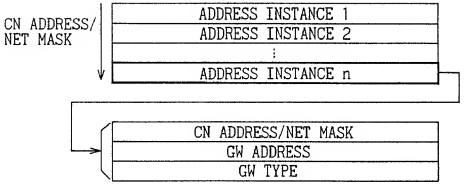

CN ADDRESS/
NET MASK
ADDRESS INSTANCE 1
ADDRESS INSTANCE 2
ADDRESS INSTANCE n
CN ADDRESS/NET MASK
GW ADDRESS
GW TYPE

Fig.9

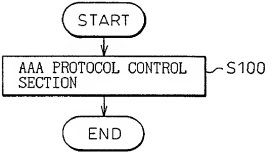

START
AAA PROTOCOL CONTROL SECTION
S100
END

Fig.10

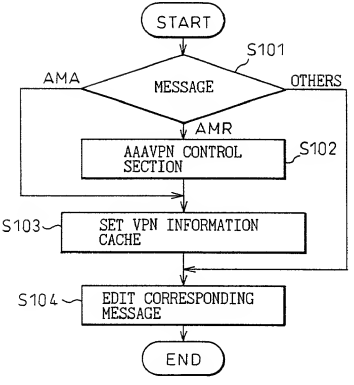
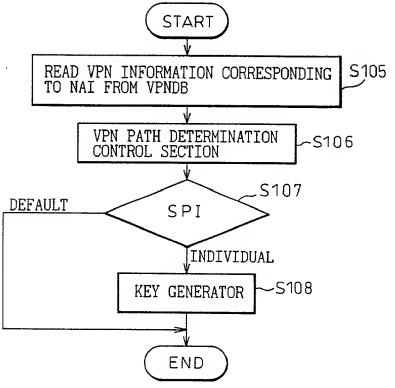


Fig.11

RECEPTION MESSAGE	PROCESSING AAA	TRANSMISSION MESSAGE
AMR	AAAF	AMR
	AAAH	HAR
AMA	AAAF	AMA
HAA	AAAH	AMA

Fig.12



EP 1 557 020 A1

Fig.13

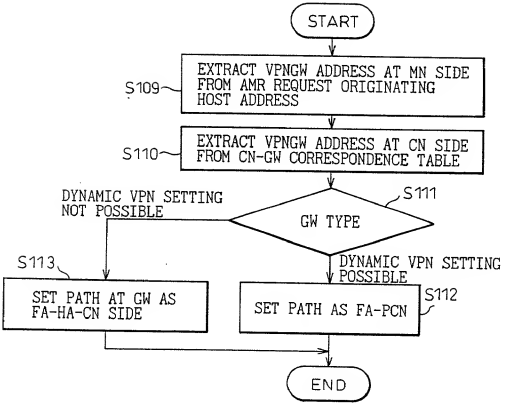

START
S109
EXTRACT VPNGW ADDRESS AT MN SIDE FROM AMR REQUEST ORIGINATING HOST ADDRESS
S110
EXTRACT VPNGW ADDRESS AT CN SIDE FROM CN-GW CORRESPONDENCE TABLE
S111
GW TYPE
DYNAMIC VPN SETTING NOT POSSIBLE
DYNAMIC VPN SETTING POSSIBLE
S113
SET PATH AT GW AS FA-HA-CN SIDE
S112
SET PATH AS FA-PCN
END

Fig.14

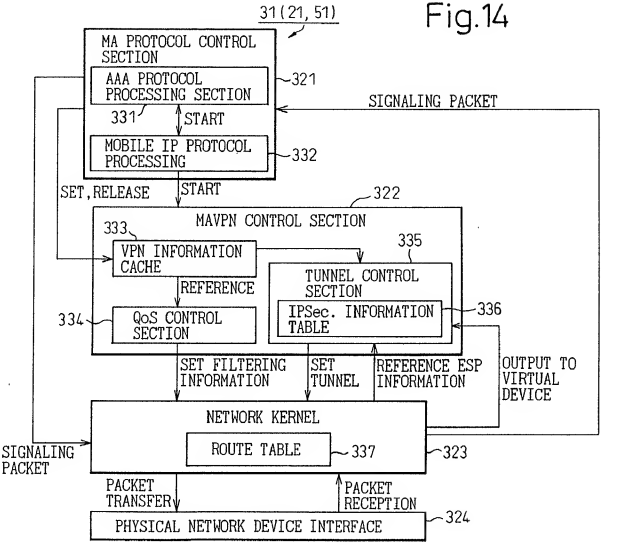
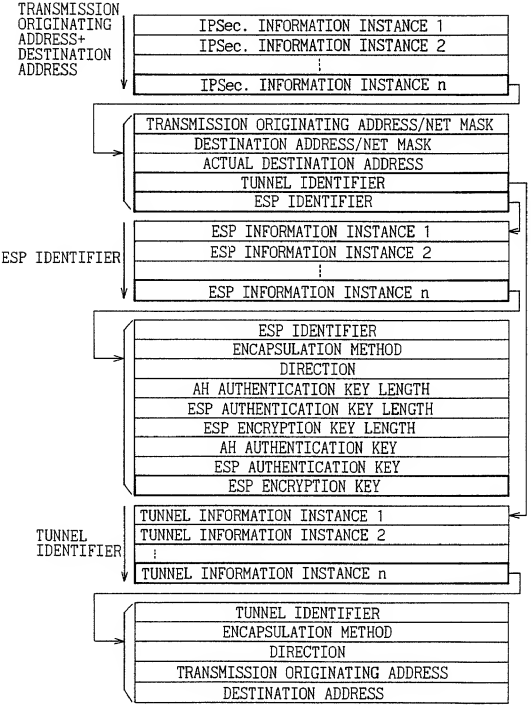
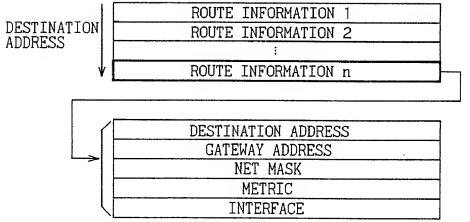

31(21, 51)
MA PROTOCOL CONTROL SECTION
AAA PROTOCOL PROCESSING SECTION
321
SIGNALING PACKET
331
START
MOBILE IP PROTOCOL PROCESSING
332
SET, RELEASE
START
322
MAVPN CONTROL SECTION
333
VPN INFORMATION CACHE
335
TUNNEL CONTROL SECTION
REFERENCE
IPSec. INFORMATION TABLE
336
334
QoS CONTROL SECTION
SET FILTERING INFORMATION
SET TUNNEL
REFERENCE ESP INFORMATION
OUTPUT TO VIRTUAL DEVICE
NETWORK KERNEL
ROUTE TABLE
337
323
SIGNALING PACKET
PACKET TRANSFER
PACKET RECEPTION
PHYSICAL NETWORK DEVICE INTERFACE
324

Fig.15



EP08075570.2/1980801

Fig.16


DESTINATION ADDRESS
ROUTE INFORMATION 1
ROUTE INFORMATION 2
ROUTE INFORMATION n
DESTINATION ADDRESS
GATEWAY ADDRESS
NET MASK
METRIC
INTERFACE

TD60C0* 2SSTD860

Fig.17

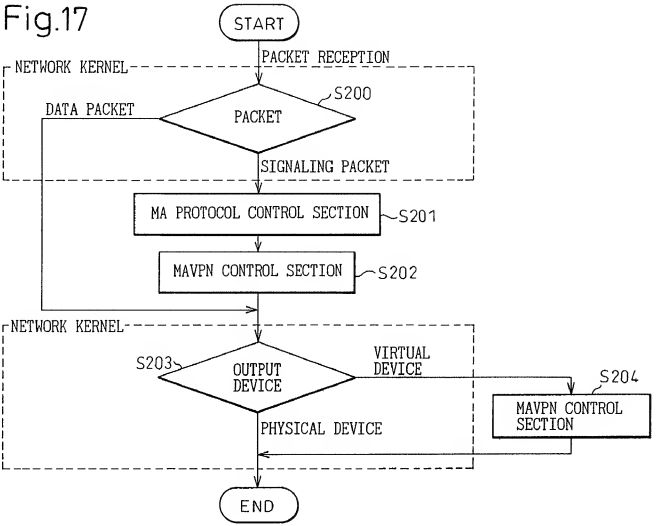


Fig.18

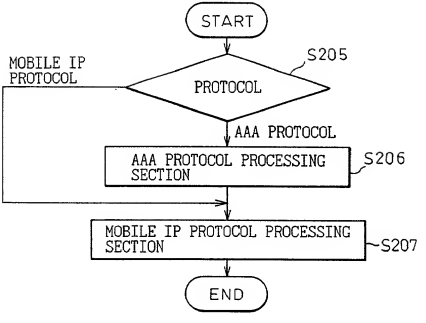
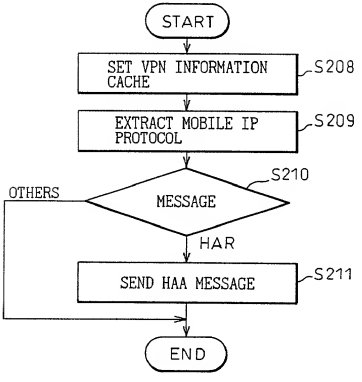

START
S205
MOBILE IP PROTOCOL
PROTOCOL
AAA PROTOCOL
AAA PROTOCOL PROCESSING SECTION
S206
MOBILE IP PROTOCOL PROCESSING SECTION
S207
END

Fig.19



FOREIGN PATENT 2004-254960

TOSOEO'ZSSTO860

Fig.20

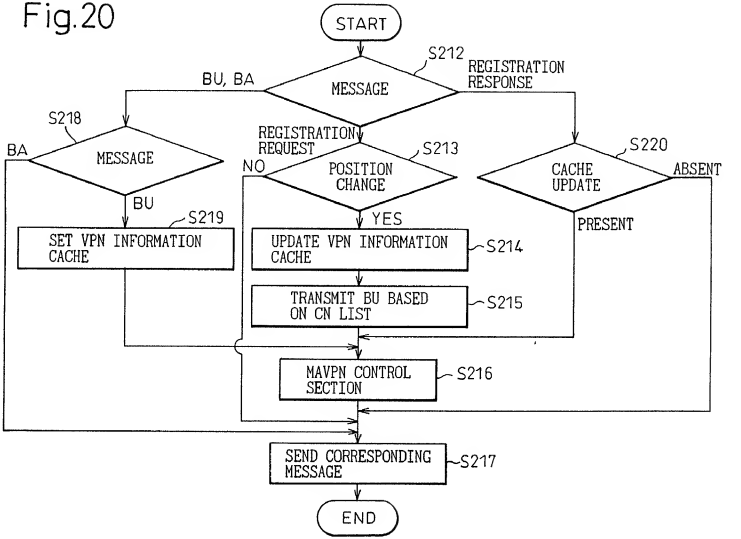


Fig.21

RECEPTION MESSAGE	PROCESSING MA	TRANSMISSION MESSAGE
REGISTRATION REQUEST	FA	REGISTRATION RESPONSE
	HA	BU
REGISTRATION RESPONSE	FA	REGISTRATION RESPONSE
BU	FA,PCN	BA
BA	HA	REGISTRATION RESPONSE

Fig.22

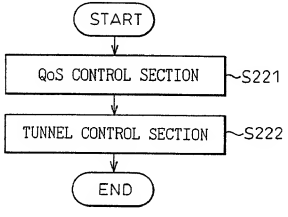
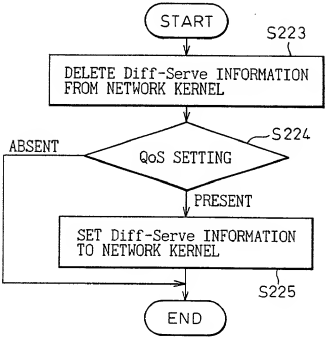


Fig.23



WO 2004/075504 PCT/JP2004/001824

Fig.24

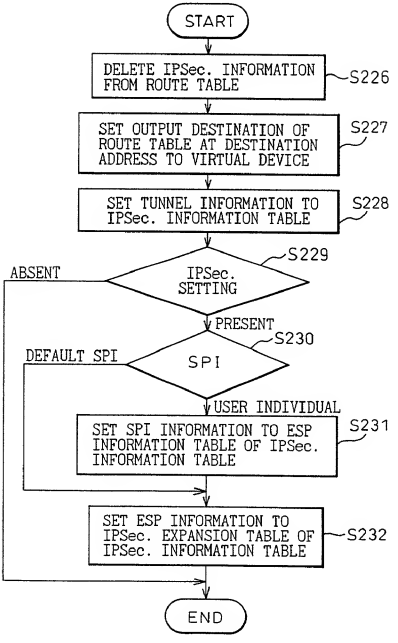
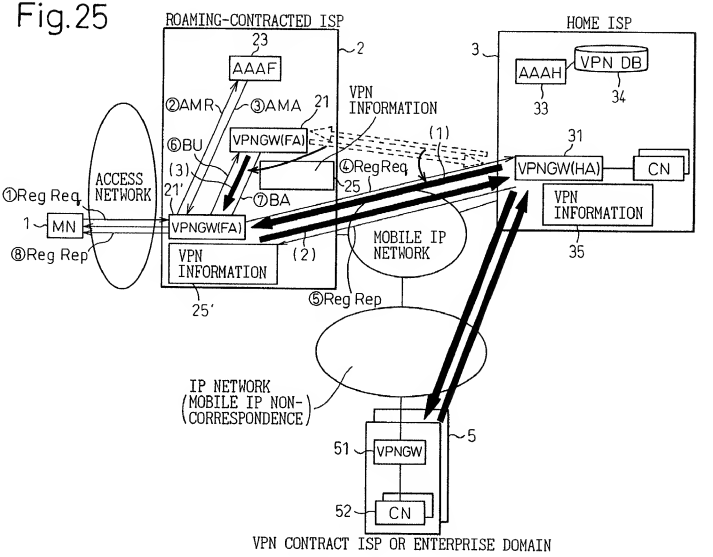
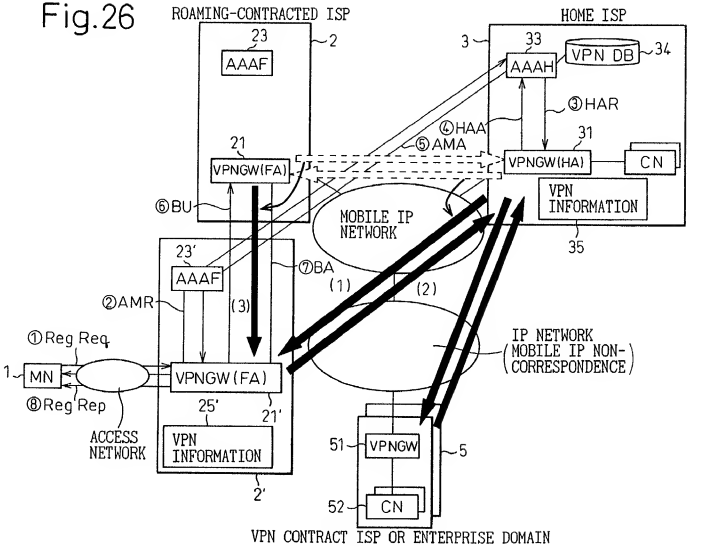

START
DELETE IPSec. INFORMATION FROM ROUTE TABLE
S226
SET OUTPUT DESTINATION OF ROUTE TABLE AT DESTINATION ADDRESS TO VIRTUAL DEVICE
S227
SET TUNNEL INFORMATION TO IPSec. INFORMATION TABLE
S228
IPSec. SETTING
S229
ABSENT
PRESENT
SPI
S230
DEFAULT SPI
USER INDIVIDUAL
SET SPI INFORMATION TO ESP INFORMATION TABLE OF IPSec. INFORMATION TABLE
S231
SET ESP INFORMATION TO IPSec. EXPANSION TABLE OF IPSec. INFORMATION TABLE
S232
END

Fig.25


ROAMING-CONTRACTED ISP
23
AAAF
2
②AMR
③AMA
21
VPN INFORMATION
⑥BU
VPNGW(FA)
(3)
21'
⑦BA
①Reg Req
ACCESS NETWORK
1
MN
⑧Reg Rep
VPNGW(FA)
VPN INFORMATION
25'
(2)
④RegReq
25
⑤Reg Rep
MOBILE IP NETWORK
(1)
HOME ISP
3
AAAH
33
VPN DB
34
31
VPNGW(HA)
CN
VPN INFORMATION
35
IP NETWORK (MOBILE IP NON-CORRESPONDENCE)
5
51
VPNGW
52
CN
VPN CONTRACT ISP OR ENTERPRISE DOMAIN

T08DE0"2SSTO860

Fig.26



TOSOEO'ZSSTOSGO

Fig.27

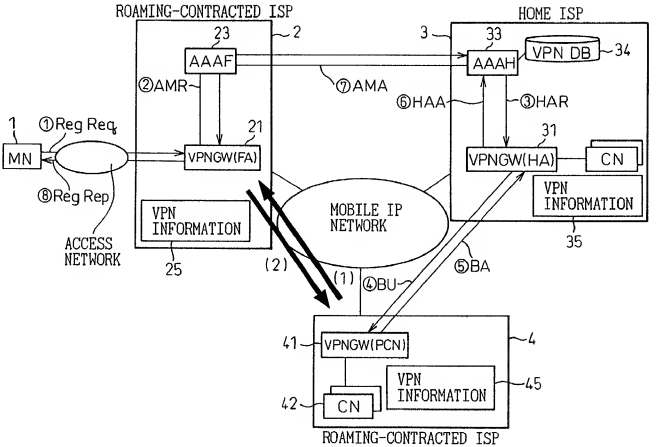


Fig.28

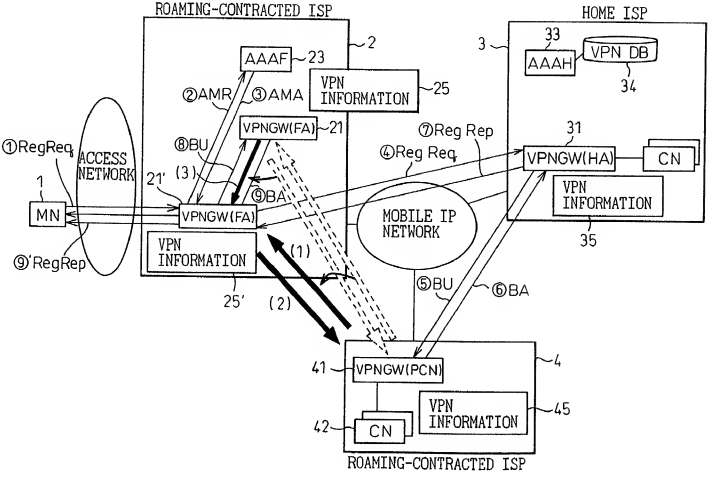

ROAMING-CONTRACTED ISP
2
AAAF
23
VPN INFORMATION
25
②AMR
③AMA
VPNGW(FA)
21
⑧BU
(3)
21'
⑨BA
①RegReq
ACCESS NETWORK
1
MN
VPNGW(FA)
VPN INFORMATION
⑨'RegRep
25'
(1)
(2)
HOME ISP
3
33
AAAH
VPN DB
34
⑦Reg Rep
④Reg Req
31
VPNGW(HA)
CN
VPN INFORMATION
35
MOBILE IP NETWORK
⑤BU
⑥BA
41
VPNGW(PCN)
4
VPN INFORMATION
45
42
CN
ROAMING-CONTRACTED ISP

Fig. 29

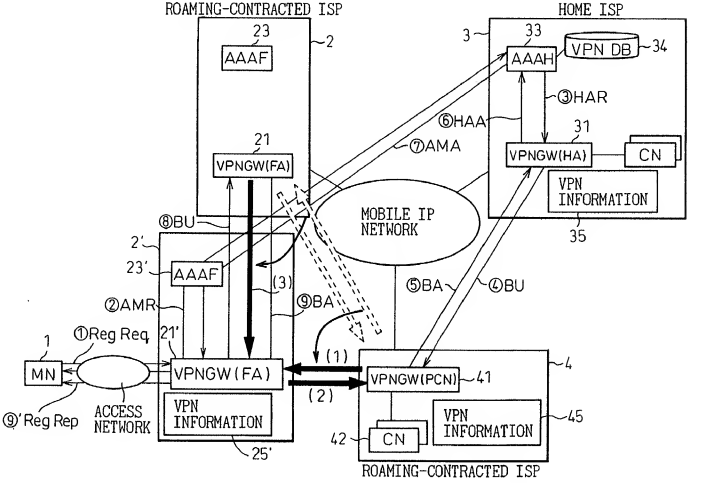
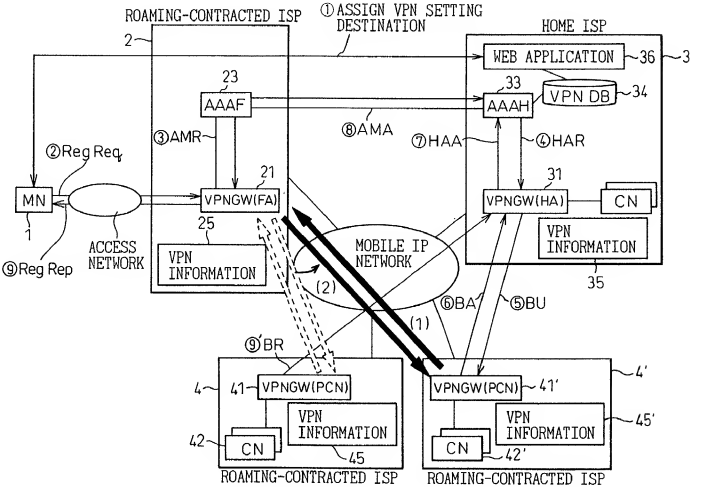

ROAMING-CONTRACTED ISP
HOME ISP
23
AAAF
2
3
33
AAAH
VPN DB
34
③HAR
⑥HAA
⑦AMA
21
VPNGW(FA)
31
VPNGW(HA)
CN
VPN INFORMATION
35
MOBILE IP NETWORK
⑧BU
2'
23'
AAAF
(3)
⑨BA
⑤BA
④BU
②AMR
1
①Reg Req
21'
MN
VPNGW(FA)
(1)
(2)
VPNGW(PCN)
41
4
⑨'Reg Rep
ACCESS NETWORK
VPN INFORMATION
25'
42
CN
VPN INFORMATION
45
ROAMING-CONTRACTED ISP

Fig.30


ROAMING-CONTRACTED ISP
2
①ASSIGN VPN SETTING DESTINATION
HOME ISP
WEB APPLICATION
36
3
23
AAAF
33
AAAH
VPN DB
34
③AMR
⑧AMA
⑦HAA
④HAR
②Reg Req
21
31
MN
VPNGW(FA)
VPNGW(HA)
CN
1
25
VPN INFORMATION
ACCESS NETWORK
⑨Reg Rep
MOBILE IP NETWORK
(2)
VPN INFORMATION
35
⑥BA
⑤BU
(1)
⑨BR
4
41
VPNGW(PCN)
VPN INFORMATION
42
CN
45
ROAMING-CONTRACTED ISP
VPNGW(PCN)
41'
4'
VPN INFORMATION
45'
CN
42'
ROAMING-CONTRACTED ISP